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# **Evaluation of Approval Request / Call for Release Procedures at Charlotte Douglas International Airport**

**DASC**  
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# Outline

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- The Challenge
- Operations
- Simulation Details
- Findings
- Summary

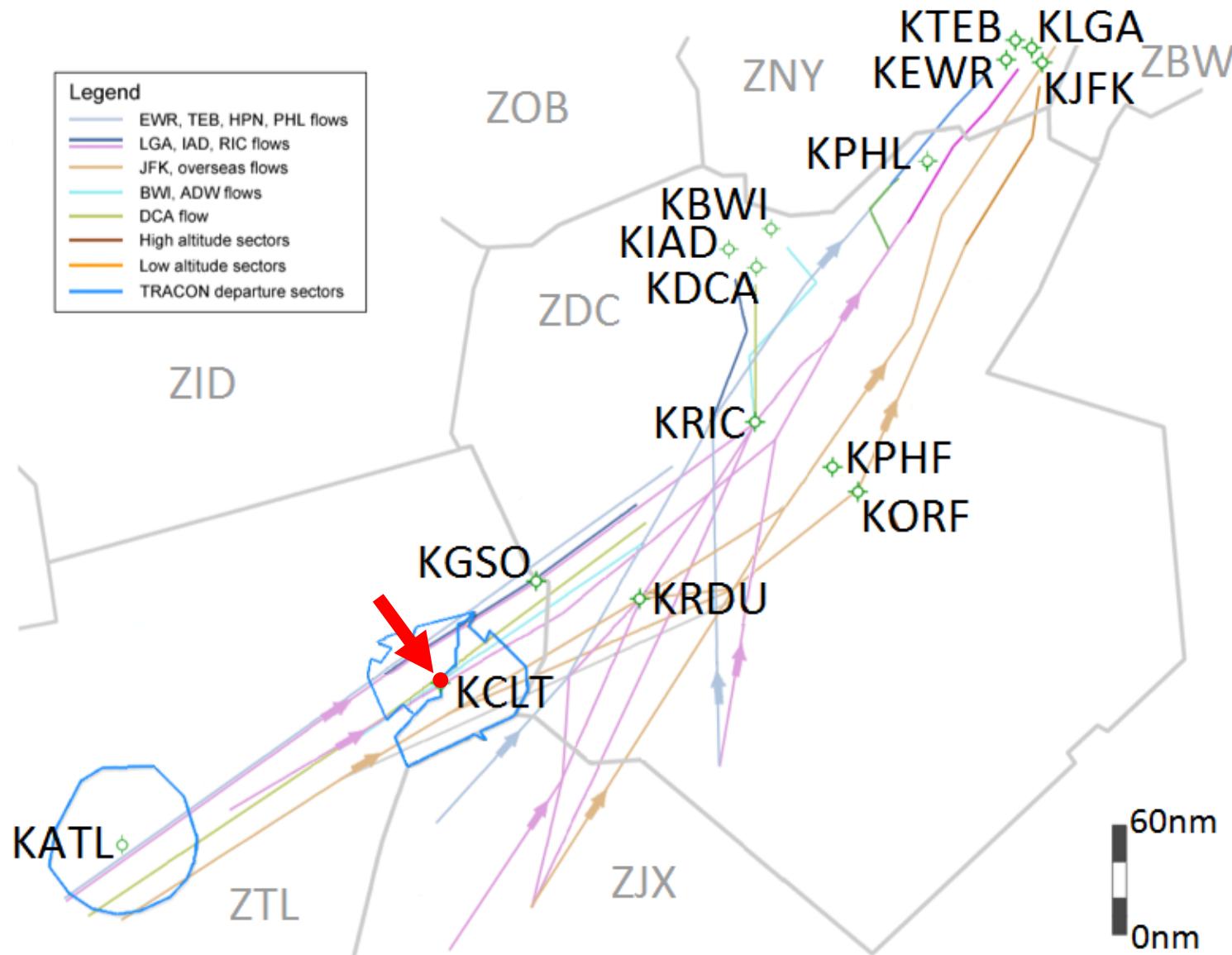
# The Challenge

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- Air traffic capacity and demand imbalances result in congestion and delays
- Traffic Management Initiatives (TMIs)
  - Strategic: e.g., Ground Delay Programs or Airspace Flow Programs
  - Tactical: e.g., Approval Request (APREQ) / Call for Release (CFR)
- TMIs can result in flow control times
  - Expect Departure Clearance Time (EDCT)
  - APREQ/CFR release time

# Charlotte Douglas International Airport (CLT) and Surrounding Airspace



# Previous Analysis



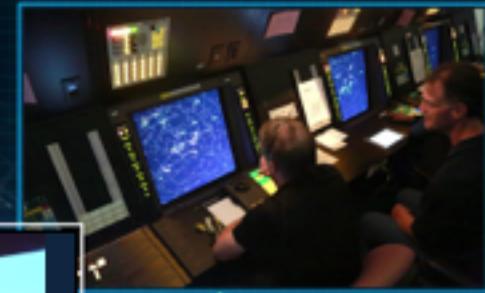
- A benefits analysis of CLT's 2014 operations
- TMI compliance = measure of predictability

TMI Compliance		
TMI	CLT	Nation-wide
APREQ only	42.9%	54.4%
EDCT only	56.8%	46.9%
APREQ when flight has both APREQ+EDCT	~42.9%	---
EDCT when flight has both APREQ+EDCT	52.0%	---

# APREQ/CFR Users



TOWER

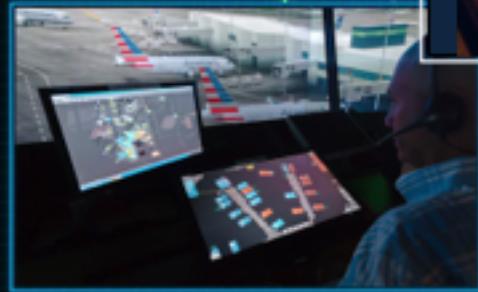


TERMINAL



RAMP

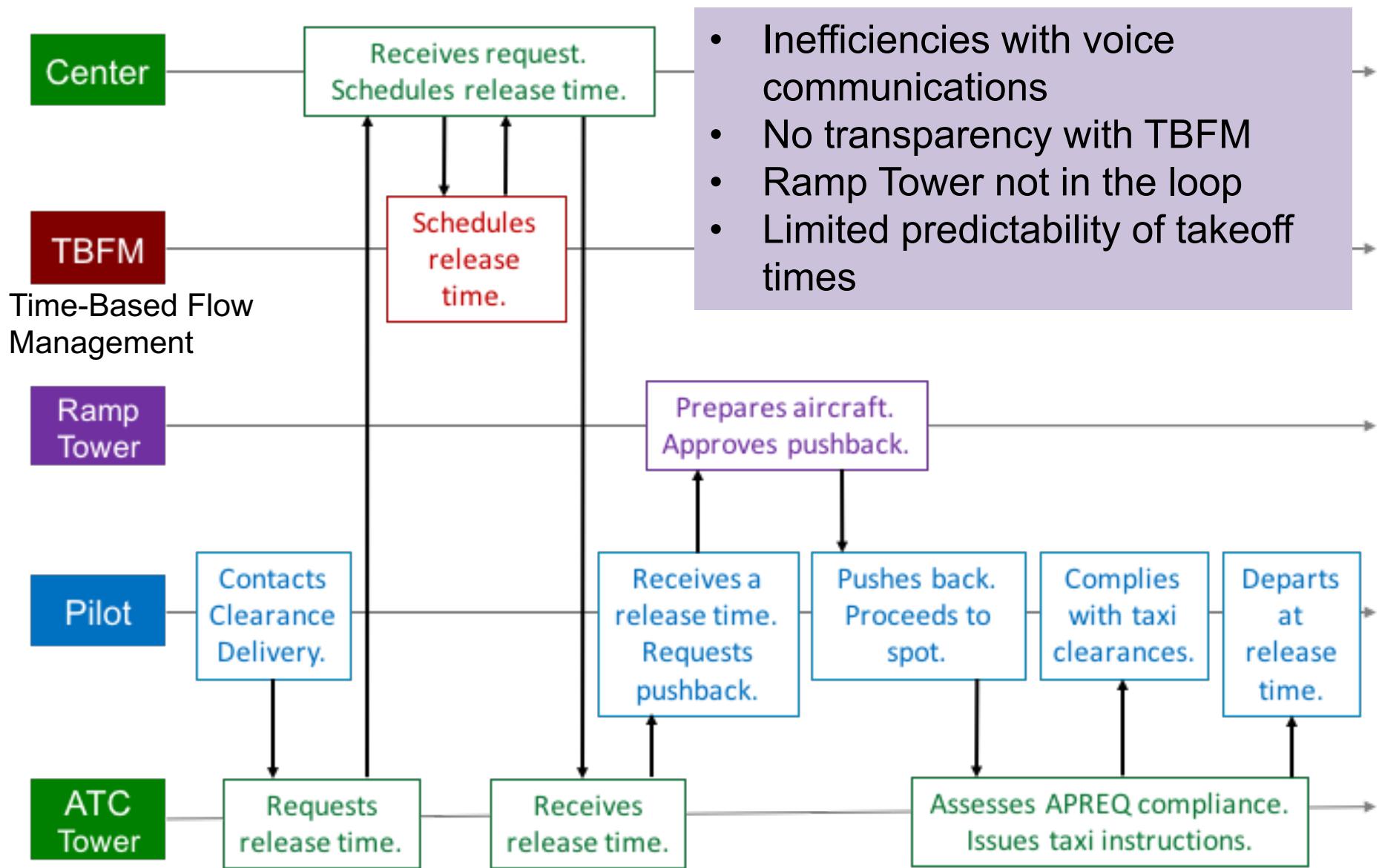
CENTER



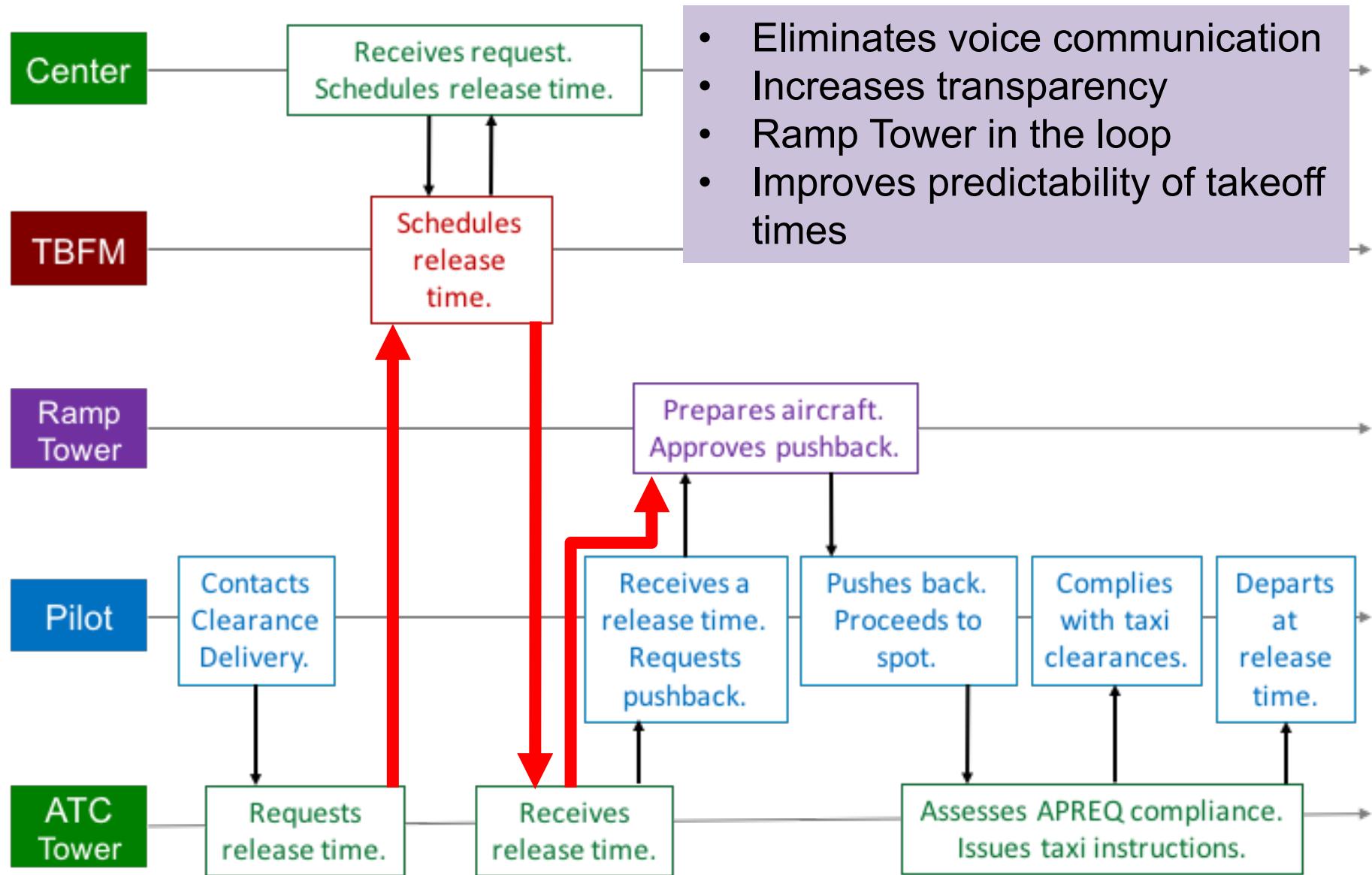
PILOTS



# Current Day APREQ/CFR Procedures



# New: APREQ Electronic Coordination



# Surface Trajectory Based Operations (STBO) Client



**Toolbar**

**Map**

**Timeline**

**Flights Table**

**Timeline**

The image displays the STBO Client interface with four main windows:

- Toolbar:** Shows a list of runway segments for Runway 23/05 and 18L/36R, including flight IDs and status.
- Map:** A map of an airport showing various runways, taxiways, and aircraft positions marked with green dots and labels like "AAL160 AB21 KORN".
- Timeline:** A timeline for Runway 23/05 showing flight IDs and times, with a current time of 19:26:47 GMT.
- Flights Table:** A detailed table of flight information including Flight ID, Dest, AC Type, Mtrd, On Ti, Etms, Eta, RwyOpNec, Rwy Time, Status, Ramp A..., Gate, Spot, and more.
- Timeline:** A timeline for Runway 18C/36C and 18R/36L showing flight IDs and times, with a current time of 19:26:47 GMT.

# Elements of User Interface Timeline



Verbal  
Coordination  
Required

Has APREQ/CFR  
restriction – needs  
release time

Has EDCT  
restriction/release  
time



EDCT  
compliance  
window

Available  
slot in  
overhead  
stream

Electronic  
Coordination  
Available

Selected  
flight  
datablock

Expect pilot call in  
10 minutes

# Compliance Indicators



- Inside of compliance window (on time)



- Outside of compliance window and early



- Outside of compliance window and late





# Human-in-the-Loop (HITL) Simulation

# HITL Objectives

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- Evaluate the new APREQ/CFR procedures
- User feedback on electronic APREQ coordination

# Participants

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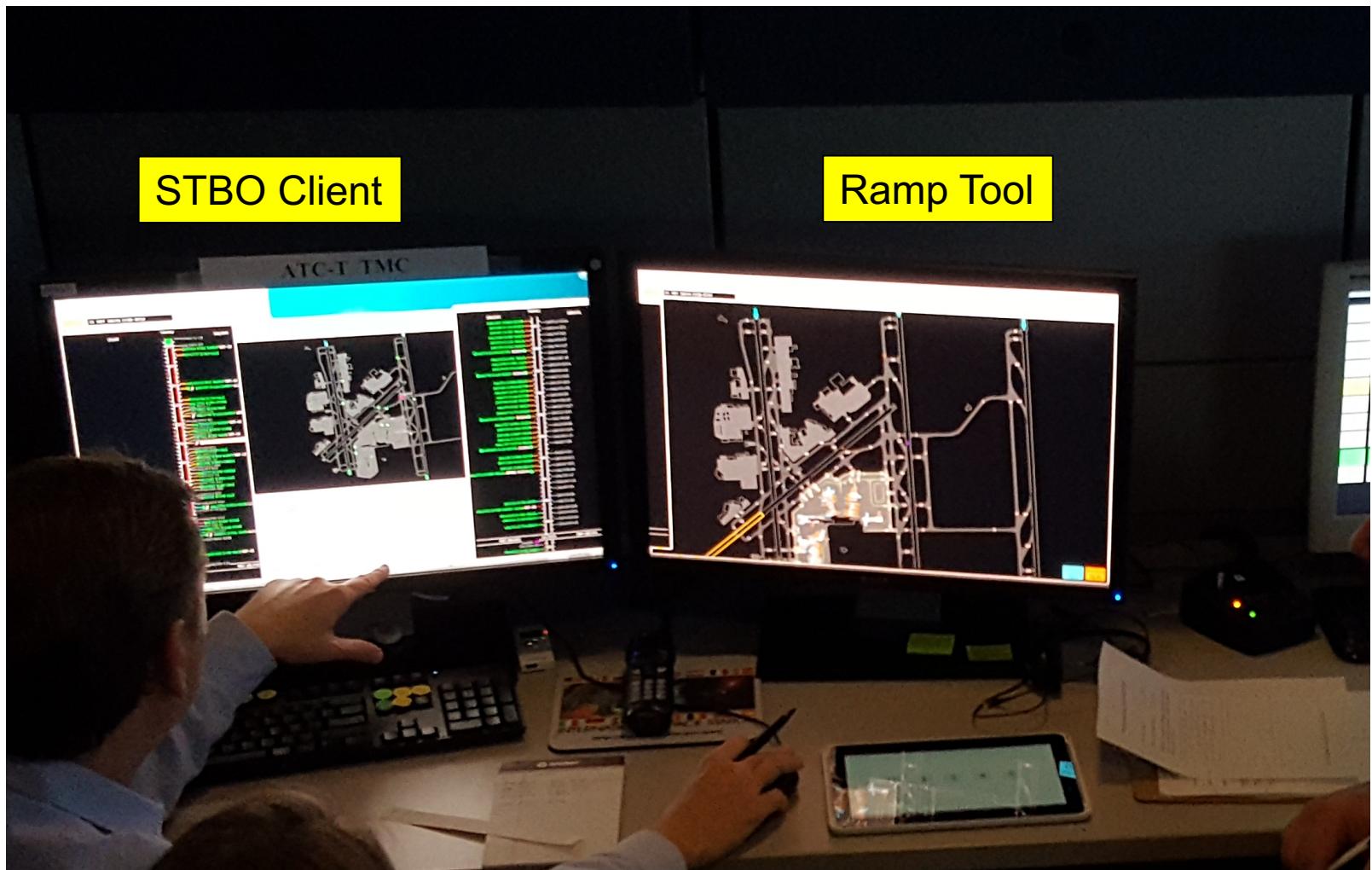


- Two active CLT Traffic Management Coordinators (TMCs) and two active CLT Front Line Managers (FLMs)
  - All four rotated through one HITL CLT TMC position
- Four Tower controllers, one clearance delivery (CD)
  - All were retired ATC confederates
- Four confederate pseudo-pilots

# Simulation Environment



# TMC Station



# Traffic Scenario in CLT

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- South Dual Converging Operation
  - 92 arrivals & 80 departure per hour
- Triple North Operation
  - 75 arrivals & 65 departures per hour
- No wind, clear visibility, but IFR in effect
- No General aviation flights
- No Cargo flights
- Duration 60 min
- 6-8 APREQ flights, 6 EDCT flights

# Tower TMC Procedures

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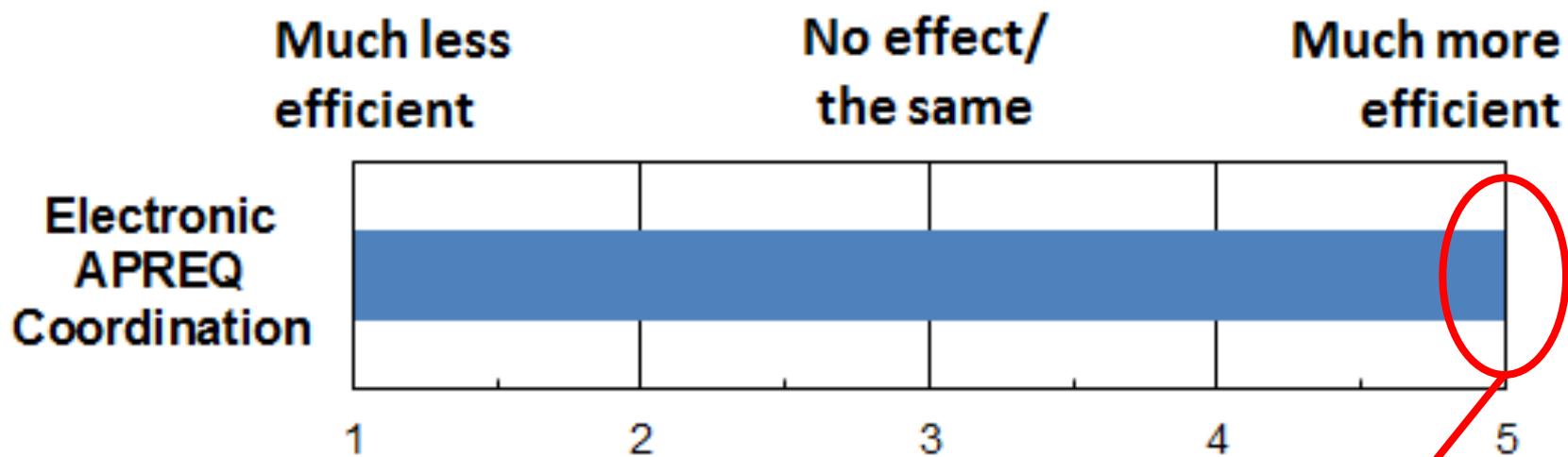


- Work the traffic as they would in the field
  - Try to maximize throughput while ensuring safety
  - Launch aircraft with APREQ or EDCT times on time
- Use electronic coordination to obtain APREQ release times when able



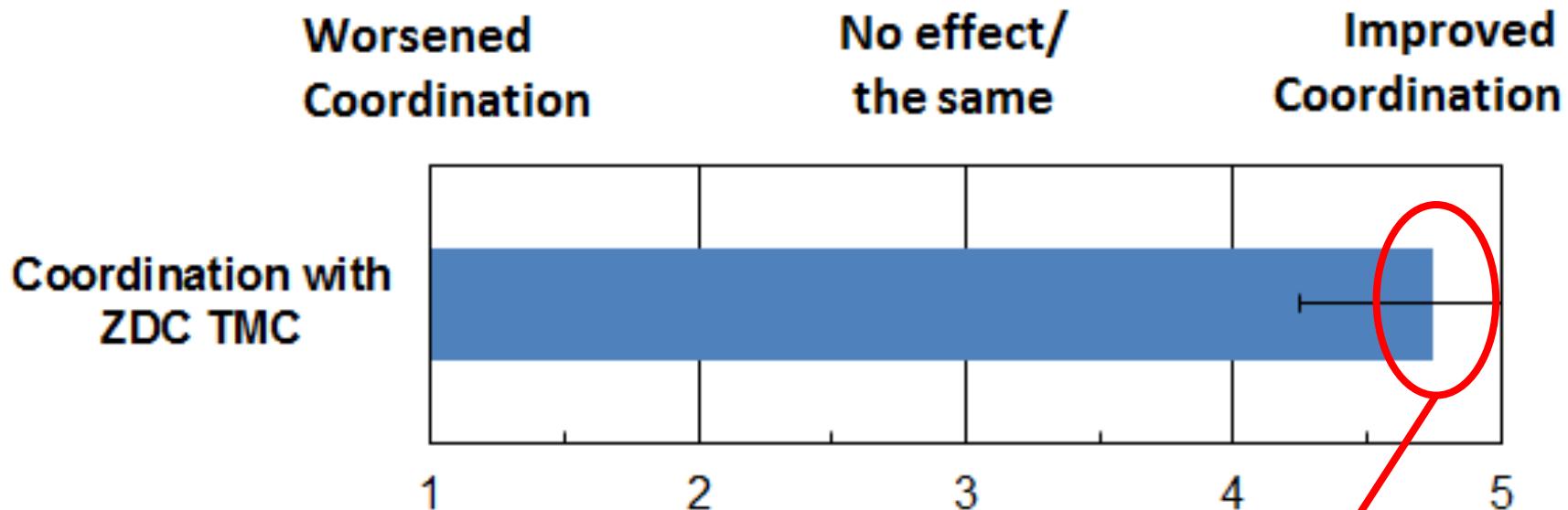
# Findings

# Comparing Electronic Coordination with Current Day Procedures



Electronic coordination was rated as more efficient than current day APREQ/CFR procedures.

# Comparing Electronic Coordination with Current Day Procedures



Participants preferred electronic coordination over current day APREQ/CFR procedures.

# APREQ/CFR and EDCT Compliance



- 24 total APREQ/CFR flights took off
  - Nine of the 24 also had EDCTs

TMI Compliance for HITL		
TMI	On time	Out of compliance, but early
APREQ only	9	6
APREQ when flight has both APREQ+EDCT	3	6
EDCT when flight has both APREQ+EDCT	4	5

No flights departed later than APREQ or EDCT  
release time windows

# User Feedback

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- Improve APREQ and EDCT compliance indicators
- Remove “thumbs up” ready icon
- Audible alerts
- Exclude individual flights from TMIs
- Adjust acknowledgement procedures

Changes have since been made in the STBO Client to address this feedback.



# Summary

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- STBO Client electronic coordination trends:
  - More efficient
  - Improved coordination with ZDC
- TMI compliance trended toward improving
  - No aircraft released late
- Demonstration of new procedures at CLT beginning Fall of 2017



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Thanks for your attention!

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